

Highline Extension Canal
(Doherty Ditch)
Denver vicinity
Denver County
Colorado

HAER No. CO-67

HAER
COLO,
16-DENV.V,
2-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
Rocky Mountain Regional Office
National Park Service
U.S. Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

HAER
COLD,
16-DENV.V,
2 -

Highline Extension Canal
(Doherty Ditch)

HAER No. CO-67

Location: The Highline Extension Canal runs from approximately 1/8th of a mile southeast of the intersection of Sixth Avenue and Interstate 225 in the city of Aurora, Colorado, north and east to the Terminal Reservoir. The canal's course crosses Arapahoe and Adams counties before it terminates in Denver County. The extant portions of the canal and its associated laterals are scattered across an area from Second Creek east to nearby Box Elder Creek, between 64th Avenue on the south and the northeast 1/4 of Section 10 of Township 3S, Range 65W on the north.

UTM: Terminal Reservoir (Feature 1)

A: 13: 529920, 4406800

B: 13: 530640, 4406620

Lateral E (Feature 2)

A: 13: 529220, 4407300

Lateral G (Feature 3)

A: 13: 530630, 4406900

B: 13: 530180, 4406800

Lateral G (Feature 4)

A: 13: 532319, 4416460

B: 13: 532380, 4415780

Lateral A (Non-extant)

A: 13: 517910, 4403580

Date of Construction: 1913 (Additions in 1924-1925, ca. 1932)

Designer: Edwin S. Nettleton

Builder: Northern Colorado Irrigation Company

Present Owner: City and County of Denver
Denver International Airport
Stapleton International Airport
Denver, Colorado 80207

Highline Extension Canal
(Doherty Ditch)
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Present Use: Abandoned

Significance: The Highline Extension Canal system helped promote the agricultural settlement of the west-central Adams County. The privately financed irrigation company planned for irrigation water to be delivered to 60,000 acres of land in what was then Adams County for use by farmers. The canal system failed to deliver the water and became instead an example of irrigation-based land speculation.

Project Statement: The city and county of Denver acquired much of the Highline Extension Canal system after annexation of the area to Denver in 1988. The land acquisitions occurred to allow construction of the Denver International Airport. The extant features that represent the canal's construction and engineering techniques are concentrated on two lateral and the Terminal Reservoir, all of which lie outside the construction zone for airport facilities, and if present plans are followed, the features should not receive direct impacts. A passive preservation plan has been established for the features.

This HAER recording project is part of both the historic preservation plan for the Denver International Airport and a long-term program to document historically significant engineering and industrial works in the United States. The city and county of Denver, through the Denver International Airport, provided funding for the airport.

Historian: Steven F. Mehls
Western Historical Studies, Inc.

March 1992

II. HISTORY

Denver was set forward a decade in material prosperity and many years in public spirit when its citizens joined in celebrating the birth of a wonderful industrial project, the Antero irrigation system.¹

The preceding quotation aptly summarizes the agricultural booster spirit rife in Colorado during the early twentieth century. To appreciate fully the significance of the Highline Extension Canal system and its associated East Denver Municipal Irrigation District, it must be viewed within that context of agricultural growth and boosterism. Examination of the undertaking within the framework of Colorado and western water resource development during the late nineteenth and early twentieth centuries provides the needed historical perspective. The Highline Extension was not an isolated project. Contemporary projects undertaken in Colorado included the Empire Reservoir near Wiggins (1905, enlarged 1910), Riverside Reservoir on the South Platte near Fort Morgan (1902) and the expansion of Barr Lake and its associated Oasis Reservoir south of Brighton (1909).²

By the early twentieth century Colorado already had developed a large body of law regarding water issues. The Colorado Constitution and later legislation embodied important tenets regarding water rights. The prior appropriation system stated that rights adjudicated first held priority in water allocation over latecomers. In other words, first in time, first in right. The beneficial use doctrine, just as important under Colorado law, stated that domestic, urban use held a higher priority than agricultural use. This precedent would become important later for the Extension Canal. The state's lawmakers established 10 water districts, each with a commissioner, and the required District Courts to act as the administrative bodies for adjudicating water rights and disputes.³

The original Highline Canal,⁴ conceived during the late 1870s and opened a few years later in 1883, proved to be among the first of many corporate land and water speculation ventures that arose throughout the state as the lawmakers perfected and refined the rules governing water usage. Edward Reser, a real estate speculator, incorporated the Colorado Irrigation Company in 1876. The Company had an option to build an irrigation system on 100,000 acres of the Kansas Pacific Railway's land grant. The scheme failed for lack of investors.

⁴The Highline Canal has been documented as HAER No. CO-43.

Two years later the Union Pacific (UP) and Kansas Pacific merged and speculators showed increased interest in developing the Kansas Pacific land grants. Jay Gould, then deeply involved in UP affairs, interested James Duff and James W. Barclay in the project. Their Platte Land Company provided capital to the Colorado Mortgage and Investment Company which would in turn be the parent company to the Northern Colorado Irrigation Company. The Northern Colorado Irrigation Company would construct and manage the Highline Canal. In 1879 Duff entered a contract with UP management to purchase approximately 120,000 acres of land adjacent to the South Platte River. The mortgage company, managed by Duff and Barclay (who was English), allied itself financially with the Platte Land Company, a land speculation venture backed by British capital. Those overseas connections earned the company the nickname of the "English Company." During 1879 the Northern Colorado Irrigation Company, the corporate entity behind the Highline Canal, adjudicated a water appropriation of 1,184 cubic feet per second (CFS), then estimated to be enough water to irrigate approximately 70,000 acres.

Water engineer Edwin S. Nettleton, who had worked on the Union Colony (Greeley, Colorado) system, designed the Highline Canal to run from the point of diversion in the Platte Canyon northeastward to and through Denver to Aurora and then northeast via the main channel and the Sand Creek Lateral. The main canal began at a diversion dam and headworks on the South Platte River. The dam stored water and channeled it into the headworks. After passing the headgates, water travelled through 540 feet of granite tunnel where it entered a 2,600 foot wooden flume. The water then entered the earthen part of the canal that was the weak link in the canal design. Too steep a downward grade caused the water pressure to erode the canal's earthen walls. Later reports indicate that the Highline cost from \$441,000 to \$644,000 build.⁴

The Highline's problems began almost as soon as it opened in 1883. The Irrigation Company sold 31,000 acres of land with water rights. The company also managed to sell another 30,000 acres without water rights. These parcels came from land they had acquired from the Union Pacific. The water supplied by the Highline proved unreliable, ranging from enough to irrigate 25,500 acres in wet years to approximately 7,500 acres in drought years, such as 1889. The canal, even in the wettest years, could not supply all the water it had sold. In that regard, the canal experienced a problem common to many western water projects. Wet years and optimistic estimates of the water supply available for diversion led the Highline and many other ditches to over commit their water.

Financial difficulties soon overtook the organization. The high costs of maintaining the canal features, especially the earthen ditch and wooden flumes, drained company funds. To remedy the situation Company officials proposed that water users pay a royalty. Nor surprisingly, the farmers who depended on the Highline challenged the royalty plan. In 1888 the Colorado legislature and the state Supreme Court supported the farmers by outlawing royalties for water rights.⁵ This case further clarified and developed Colorado water law. (See HABS CO-123 for additional detail).

By the 1890s all parties involved realized that the Highline could never be successful without a more dependable water supply. In 1892 David Richards sued the company for crop damages as a result of failure to deliver ditch water. He received damages from the court. Conceptually, the answer, storage reservoirs, came from Cyrus Richardson, a Denver attorney, when he acquired reservoir sites in South Park, including the Antero and Lost Park sites, and formed the Highline Reservoir Company. Richardson planned to sell water from his proposed Antero Reservoir to the Highline Canal and develop a new irrigation district downstream from the Highline, on land he owned east of Denver. Richardson began construction on the Antero Reservoir before his death in 1893.⁶

The 1890s, a turbulent period for the Colorado economy and the state's farmers, prevented significant new developments for the Highline Canal or the Richardson plans for reservoirs and extensions. The economic problems, common to Colorado and many other western states, led many politicians and boosters to consider how best to stimulate growth and develop the state's remaining unsettled lands. Much of the talk centered on how to finance irrigation projects for the West.⁷ These debates as much as the work of promoters such as T.C. Henry or Henry L. Doherty kept water projects in the public eye.

The discussions, no matter how positive, accomplished little until individuals and corporations stepped forward to finance the projects. During the early years of the twentieth century the well known deficiencies of the Highline Canal system had yet to be adequately addressed. Promoters of the Highline Ditch Company, including many from the Colorado Mortgage and Investment Company, in 1903 revealed plans to purchase the Antero and Lost Park reservoir sites. Those sites, together with the Highline Canal, allowed the promoters to establish a new downstream irrigation district to purchase Antero water.⁸

The Highline Ditch Company found itself in court almost as soon as the investors began raising capital for reservoir construction. The ditch company proposed construction funding through \$1.1 million in bonds to be paid for by the water users. Attorney A.B. McKinley, representing the farmers, stopped the bonding plans after four years in court. Instead, he offered other financing solutions. Interestingly, nobody opposed the idea of building the reservoirs, or expanding the reach of the canal to new lands. Rather, the question remained how to finance construction of the storage facilities, other canal improvements and the extension.⁹

As the Highline Ditch Company promoters pondered financing, others took an active part in boosting the project. During the summer of 1907, playing on Denver's rising booster spirit, McKinley and others began promoting the Highline Improvement Fund, an auxiliary funding source. Civic leaders such as David H. Moffat subscribed to the fund and Denver's Mayor Robert Speer endorsed the idea.¹⁰ As the Improvement Fund forces developed their plans, others also took a new interest in the expanded Highline Canal system. A syndicate of Greeley and Denver investors, headed by Horace G. Clark, purchased the assets of the Highline Reservoir Company from Cyrus Richardson's widow for \$50,000 in September, 1907. Clark and his associates formed the Antero and Lost Park Reservoir Company in October, 1907, with capitalization of \$2 million. They set off with high hopes and many endorsements to complete the Antero Reservoir and extend the Highline Canal to irrigate 60,000 acres in Adams County northeast of Denver.¹¹ Clark's action effectively eliminated the Highline Ditch Company from the scene.

While Clark completed his maneuvers to gain control of the crucial reservoirs, others imagined the opportunities for farmers that another 60,000 irrigated acres represented. Farmers in the South Platte Valley, Arkansas Valley and the Grand Valley (Grand Junction, Colorado, area) all were experiencing some of the most prosperous years they had ever known due to expanded irrigation facilities and the rapid spread of sugar beet cultivation. From 1899 through World War I thousands of acres were planted in beets, dozens of beet sugar factories were built and beet farmers enjoyed a previously unknown prosperity. Sugar mania gripped the state. Booster literature left the impression that anyone could make his fortune with sugar beets if he could obtain land and water.¹² No doubt many farmers and would-be farmers felt that they too could reap the cash harvest of sugar beets once Clark and his associates completed the Highline Extension Canal.

Clark's grand plans of 1907 to expand the Highline Canal system, including the new reservoirs (Antero and Lost Park) remained paper schemes for approximately six years. During that period the promoters, still led by Clark, worked to secure financing and water for the project. The first steps of the Clark enterprise, known as the Antero and Lost Park Reservoir Company, or simply the Antero Company, involved engineering studies to consider costs and materials necessary for rehabilitation and modernization of the existing Highline Canal. Field, Fellows and Hinderlider, a Denver water engineering company, issued two separate reports during late 1907 about the project. The engineers discussed the extension plans and the need for adequate storage reservoirs in the more detailed of the two reports. They concluded that the Highline would need significant improvements to meet the needs of 1907. Moreover, they identified what became a critical, but little discussed, problem that would eventually doom the Highline Extension. They concluded that the existing Highline water right could not adequately serve the present users, much less supply water to another 15,000 to 85,000 acres in the proposed Extension area.¹³

Clark's Antero Company purchased the Highline Canal from the English Company for \$600,000 in February, 1909. Clark's group then established a new firm, the Antero Land and Irrigation Company, in May, 1909 to manage the canal and reservoir sites and promote the new irrigation district in Adams County. Clark's new Antero company bought 10,800 acres of Platte Land Company property. They offered potential settlers both land and water rights to both the Highline Canal and Antero Reservoir.¹⁴ While the land jobbers searched for settlers, the engineers also went to work.

Field, Fellows and Hinderlider issued a non-committal preliminary report on the costs and feasibility of the Highline Extension (Adams County) project in 1909. The 1909 engineering report called for extending the canal approximately twenty miles and adding four major laterals as well as two smaller ones to supply the projected farms of the Denver Suburban Irrigation District, as the Extension was then called. The engineers' system envisioned irrigating over 42,000 acres by gravity flow without any pumping stations or siphons. However, they called for an Extension design that did not include any reservoirs in the new irrigation district. Rather, their plan depended on a vastly increased flow in the old Highline Canal to get water to all the laterals as far east as Box Elder Creek. Their review of the existing Highline indicated that during the two years since their last report no significant improvements had been completed on the

Highline. Their estimates for the entire project, except the Antero Reservoir, placed the cost at \$519,265, with more than 60% of that figure to be spent on upgrading the existing Highline Canal to correct deficiencies that dated to its original construction.¹⁵

The Antero Company hoped to use the engineering study and other publicity to secure financing for the system. The Antero group encouraged property owners in the area to form an irrigation district to guarantee the bonds. In turn, the Antero Company would sell the bonds to finance the construction of the Highline Extension and other improvements. The newly renamed East Denver Municipal Irrigation District approved a \$3 million bond issue in October, 1910. With that news in hand, the Antero Company began plans for completion of the Antero Reservoir. During August 1910, the Antero Company had contracted to purchase the Antero Reservoir, Highline Canal, and finance the construction of Highline Extension Canal system. The older Antero and Lost Park Reservoir Company maintained possession of the properties until the new company and irrigation district completed their projects. After completion, the properties would be deeded to the irrigation district. The first step, concreting the front of Antero Dam, completed in 1911, resulted in Antero Company claims that the reservoir could hold 25,000 acre feet of water, enough to supply the new irrigation district. In early 1911 E.E. Baker developed plans for the irrigation system that included the Abbott and Terminal Reservoirs in the East Denver district.¹⁶

The Antero Company failed to sell the irrigation district bonds. During late 1912 Horace Clark began negotiations with Fred Lucas, irrigation engineer for Henry L. Doherty and Company, to have the Doherty interests assume control of the project. Doherty, a New York capitalist and president of the Denver Gas Company, enjoyed a reputation as a successful utilities magnate. In August, 1906, Doherty spent a few days in the Denver jail after accusations of election fraud in a municipal election regarding utilities franchises surfaced.¹⁷ Despite his exoneration, Doherty chose to stay in New York for the next few years. However, he carefully maintained his connections with Denver's leaders such as Gerald Hughes and the law firm of Macbeth and May.¹⁸ Not surprisingly then, Doherty remained aware of the project and announcement of his possible interest in it raised speculation that the project might be completed.

In January, 1913 Doherty agreed to underwrite the bond issue and oversee construction of the Highline Extension Canal system. At that time Doherty and his irrigation engineer, Fred Lucas, also

held interests in the Dolores Project and the Redlands Project near Grand Junction.¹⁹ During February, 1913 the Doherty group awarded Joseph Osner the contract to construct the Highline Extension system. By then cost estimates had risen to \$700,000. Osner began work in March, 1913 and promised completion by the end of June. It should be remembered that Baker's 1911 plans called for the main canal of the Highline Extension to start at a proposed reservoir on Tollgate Creek and extend northeast 21 miles to the Terminal Reservoir near Box Elder Creek. Seven lateral canals were to be constructed off the main extension, totaling an additional 45 miles. However, Lucas and Doherty, possibly looking back to the 1909 plans, convinced the Irrigation District and the Antero Company that Baker's proposed reservoirs were unneeded and the construction contracts were modified to reflect that change. The Doherty-Osner group then proceeded with the work.²⁰

In June, 1913 Denver businessmen organized a banquet to honor Doherty for the near completion of the Highline Extension Canal system.²¹ However, the celebration proved premature. Doherty carried completion work ahead until October, 1913 when Clark accused Doherty of failing to build the system according to the original specifications, including the Abbott and Terminal Reservoirs. That dispute festered until March 18, 1914, when Clark issued an ultimatum to Doherty and refused to honor Doherty's monetary claims. Part of Clark's reluctance to settle the issue with Doherty in a timely manner may have come from problems inherent in irrigation district bonds generally.

According to some contemporary sources, Clark's desire to break the contract with Doherty and the irrigation district dated to the fall of 1913 or early 1914 when Denver officials approached him regarding sale of the Highline and reservoirs to the City. The municipal bonds the City offered Clark probably would have maintained their value better than the ones from the irrigation district, that might have to be discounted as much as 50%. In August, 1915 Clark contracted to sell the Highline Canal and Antero Reservoir to the City of Denver, through its Public Utility Commission.²²

Clark's actions led to several suits and a five year period of litigation ensued. The case of Doherty versus the Antero Company eventually went to the Colorado Supreme Court, which ruled in favor of the reservoir company in November 1920. That decision cleared the way for the City of Denver to acquire the Highline Canal and Antero Reservoir. The City took possession of the property in 1924.²³

During the litigation, no irrigation water ran through the Highline Extension Canal system. The Rocky Mountain News aptly summarized the state of affairs in 1922, saying the Extension Canal would need to be "dusted out" and that for the East Denver Municipal Irrigation District, "water has never been supplied to these 60,000 acres."²⁴ After the City of Denver acquired the Highline Canal and Antero Reservoir, the Denver Utility Commission decided that urban domestic water needs had a higher priority than downstream farmers. In a broader sense this was also a recognition that water supply control may belong more appropriately in the hands of municipalities rather than for-profit organizations. In line with the Progressive spirit of the age, governments were assuming responsibility for many services related to the public good. The East Denver District farmers complained, even taking their case to court, but they found no relief.²⁵ In 1924 Doherty conveyed ownership of the Highline Extension Canal system to the District Landowners Trust, then managed by Denver attorney, I.B. Melville. The Landowners Trust realized that Denver was unlikely to supply water to the system on a regular basis and proceeded with construction of the Terminal Reservoir after they had ownership of the system. They realized that only extensive storage facilities could impound and store the waste (surplus) water that reached the Extension from the old Highline and the natural run-off of local streams. The wet years of the late 1920s may have allowed some water to flow in the Extension. By the late 1930s other smaller reservoirs, such as one on Third Creek also had been constructed, but by then it was too late for many farmers.

The situation for the farmers grew progressively worse through the 1920s. The property owners had mortgaged their property to raise the \$3 million construction bond issue. To aid the landowners, the District Landowners Trust loaned them money. During the 1920s, when Denver provided no water for irrigation, many of the farmers went bankrupt, leaving the Trust in possession of an ever-growing area. Despite its best efforts, the Trust failed to keep the Highline Extension Canal system in some state of repair. The bankruptcies and continued lack of water eventually forced the Trust to stop property tax payments. During the 1930s L.C. Fulenwider paid the back taxes owed to Adams County and acquired much of the land formerly controlled by the District Landowners Trust. In this manner, Fulenwider pieced together his Box Elder Farms, leasing the ground to tenant farmers. After 1940 many of these tenant farmers plowed over the Highline Extension Canal laterals as they expanded their non-irrigated winter wheat fields.²⁶

Today the remnants of the Highline Extension Canal system stand as a monument to the speculative mania in reclamation projects that gripped Colorado and its eastern plains during the first decades of the twentieth century. That the canal and its features never succeeded offers testimony to the hopes of man and the realities of nature. The waters of the South Platte River, appropriated beyond their capacity before the project started, could not support the East Denver Municipal Irrigation District. The planners recognized this when they talked of depending on surplus flood waters to supply the farmers.²⁷ As the course of events played out the Highline Extension became just one more of the dozens of failed irrigation projects built in Colorado during the early twentieth century.

III. DESCRIPTION

The Highline Extension Canal system was built as a series of earthen canals with concrete and steel used to construct tainter style headgates, weirs and drops. It diverted from the original Highline Canal at a point in modern Aurora, Colorado, near Sixth Avenue and Interstate 225. From the point of diversion the main canal extended generally northeast approximately 21 miles ending at the Terminal Reservoir near Box Elder Creek after the reservoir was completed during the mid-1920s. Seven lateral canals, known as Laterals A - G, were constructed off the main channel. These laterals totaled an additional 45 miles to the system. The laterals tended generally northwest or north from the main channel. Today most of the laterals and portions of the main canal have disappeared from the landscape due to neglect and plowing. As a result there are numerous examples of concrete features, such as drops or headgates, left totally isolated from other evidences of the canal. Some of these features fall within the Denver International Airport area and some do not. Field surveyors identified five distinct portions of laterals and the Terminal Reservoir within the airport's boundaries. The surveyors found that most of the laterals had been all but destroyed by plowing and other agricultural activities.

Today, three extant features associated with the laterals and main canal and the Terminal Reservoir, the fourth extant feature, retain enough physical presence to be considered representative of late nineteenth and early twentieth century irrigation system construction techniques.

The Terminal Reservoir, (feature 1) is located downstream on the main canal about half a mile from the opening for Lateral E (feature 2). The Terminal Reservoir is located in Section 10, T.3S, R.65W. The dam for the reservoir is an earthen structure approximately 600 yards long, blocking an intermittent tributary of Box Elder Creek. The top of the dam is about twelve feet across, and its earthen wall slopes about fourteen yards to the north (grade of approximately 50%) and seventy feet to the south (grade of 20%). The original engineering drawing for the dam shows that it was planned to be 28 feet high with the intent of holding back a reservoir with a capacity of 2,632 acre feet of water.²⁸ The reservoir was then to feed water to Lateral G of the Highline Extension Canal system. A concrete "morning glory" type spillway (upright cylinder with valves inside and an overflow pipe) lies inside the reservoir pool area. The earthen dam and spillway represent the most common types built in Colorado.²⁹

It remains doubtful that the Terminal Reservoir ever fulfilled its storage role adequately. 1937 maps of the area indicate that the District Landowners Trust had built reservoirs on Second and Third Creeks to feed water to irrigators on Lateral D and Third Creek.³⁰ The Terminal Reservoir dam is in good physical condition. Some cottonwoods are growing along its side and a heavy growth of vegetation is present in the fenced reservoir pool area. The dam still impounds small quantities of water from the local drainage.

Lateral E (feature 2), which begins in Section 3, T.3S, R.65W, represents the types of headgate systems associated with both the main Highline Extension Canal and the beginning of the laterals. The feature also contains portions of the main canal and the lateral. The headgate system functioned as a method to divert water from the main Highline Extension Canal into Lateral E. The extant portion is bounded on the north and south by two concrete features. The two concrete features are a connected pair of headgates and one separate headgate (see sheet 2 of 2). The double gate marks the beginning of Lateral E, with the gate to Lateral E being about ten feet wide. The gate to the main canal is similar to the one for Lateral E. The double gate includes concrete walls about fifteen feet long west of the gate and a winged wall that extends from the gate about thirty feet to the east. On the north side of the gate the lateral is bordered by concrete walls about 12 feet long in the direction of the flow. Concrete wings and headgates represent an early twentieth century type of construction as concrete replaced cut stone in many projects as a cost-saving measure.

Also visible in the area considered as feature 2 are the remains two earthen ditches, the main channel and Lateral E. The extant portion of the main canal is about thirty feet wide and no more than eight feet deep with berms on both sides. Engineering reports indicate that the main Highline Extension Canal prism was planned to be about 40 feet wide, six feet deep and 21 feet across at the bottom, with a capacity to carry almost 400 cubic feet of water per second. In this area Lateral E is an earthen ditch about fifteen feet wide at the bottom, with a berm no more than eight feet high and 24 feet wide on the east side. It extends about 160 yards from the main channel before it terminates. Some 120 yards north of the main canal is another concrete headgate feature in Lateral E. The gate is about twelve feet across in the bottom of the ditch, with concrete walls extending about nine feet to the east and west. On the north and south sides of the gate are concrete walls extending for about ten feet along the ditch. Minor impacts to this segment include vandalism, in the form of graffiti and trash disposal, but this has not destroyed the general physical integrity of the features of this segment. From the headgate for Lateral E the main canal originally turned southeast and continued about half a mile to the Terminal Reservoir (feature 1).

The third feature is located near the western end of the dam at the Terminal Reservoir. Feature 3 is the headgate system intended to divert the flow of water into either the reservoir or Lateral G. There are four headgates in this complex, a double gate that channeled the flow of supply water to the reservoir or the lateral and three other gates. The double gate is 12 feet wide and four feet tall made of concrete. The other three gates are in the flow line to Lateral G and each is eight feet wide and approximately three feet tall. All three are made of concrete.

A portion of Lateral G, (feature 4) built in 1913 and located in Section 1, T.2S., R.65W. represents the typical lateral construction engineering and construction techniques used by Joseph Osner to construct the Highline Extension Canal system. The feature is located in a tract of land that has not been used for agriculture. Rather, it is pasture, a land use compatible with the site's preservation to date. The site, labeled as an abandoned ditch on the 1952 Horse Creek USGS topographic quadrangle map, previously had been shown as an extension of the abandoned "Doherty Ditch Lateral" system on the 1939 edition of the USGS map, information that would confirm accounts of total abandonment of the system by 1940. The extant portion of Lateral G is about 900 yards long, beginning at the center of Section 1

and winding its way northward to the section line. Generally, the resource consists of an earthen ditch, varying from 10 to 25 feet across and between one to no more than three feet deep. Parts of it are cut into a hillside, with a berm serving as the east bank. Some erosion is present where an access road crosses the lateral in the middle of the field. Otherwise, the remainder of the site is in good physical condition.³¹ The ditch and earthen berm represent typical construction methods for canals built during the nineteenth and early twentieth centuries.

IV. ENDNOTES

1. Denver Republican, 21 June 1913, p. 1.
2. Federal Writers Program, Colorado, "Irrigation in Colorado," pp. 6-9, Colorado Historical Society, Denver, CO.
3. For a complete discussion of the Colorado Doctrine, as this collection of laws was referred to, please see: Robert G. Dunbar, Forging New Rights in Western Waters, (Lincoln: University of Nebraska Press, 1983).
4. A.D. Wall to E.G. Plowman, 11 October 1933, Denver Water Department, Engineering Records Office, Denver, CO., and Paul D. Friedman, "Historic Properties Preservation Plan For the New Denver International Airport, Denver County, Colorado," September 14, 1990, New Denver Airport Office, Stapleton International Airport, Denver, CO, p. 106.
5. The legal problems encountered by the Highline and other early canals are chronicled in Robert G. Dunbar, "The Origins of the Colorado System of Water-Right Control," The Colorado Magazine 27 (October 1958): 241-262. It should be noted that a number of similar cases were presented to the Colorado courts during the 1870s and 1880s and that the Highline case was not unique.
6. Friedman, "Historic Properties," p. 106.
7. Carol J.D. Mehls, "Into the Frying Pan: J. Edgar Chenoweth and the Frying Pan-Arkansas Reclamation Project" (Ph.D. dissertation, University of Colorado, 1986), pp. 43-46.
8. Denver Republican, 7 April 1907, p. 3.
9. Ibid., 7 April 1907, p. 3, and 10 May 1907, p. 12.

10. Ibid., 21 August 1907, p. 5, and 22 August 1907, p. 3.
11. Ibid., 20 October 1907, p. 1, and Earl L. Mosley, "History of the Denver Water System," undated manuscript, Denver Water Department, Engineering Records Office, Denver, CO., pp. 73-74.
12. Alvin T. Steinel, History of Agriculture in Colorado, (Denver: State Board of Agriculture, 1926). pp. 281-310.
13. Field, Fellows and Hinderlider, "Report on the Highline Canal System," ff 203, and "Computations for Report on English Highline Canal for the Central Colorado Power Company," ff 261, Michael Creed Hinderlider collection, Colorado Historical Society, Denver, CO.
14. Friedman, "Historic Properties," p. 107.
15. Field, Fellows and Hinderlider, Preliminary Report on the Cost of Enlarging the Highline Canal and Constructing the Denver Suburban Irrigation District," 24 June 1909, ff 206, Hinderlider Collection, Colorado Historical Society, Denver, CO.
16. Mosley, "Denver Water," pp. 50-51, 54-55.
17. Denver Republican, 10 August 1906, p. 4, and 18 August 1906, pp. 1, 12.
18. Correspondence to H.L. Doherty, letterbooks 16, 23, 27 and 30, Macbeth and May Collection, Colorado Historical Society, Denver, CO., and Letter, FWF to Gerald Hughes, 25 August 1909, ff 1221, Gerald Hughes Collection, Colorado Historical Society, Denver, CO.
19. Denver Republican, 6 January 1913, p. 2.
20. Letter from the Denver Water Consumers League to the Denver Utilities Commission, 11 September 1915, quoted in Mosley, "Denver Water," pp. 54-56.
21. Ibid., 21 June 1913, p. 1.
22. Water Consumers Letter, Mosley, "Denver Water," pp. 54-60.
23. Case 9360, Colorado Supreme Court, Folio vol. I, pp. 10-11, 97-101, 219-221 and vol. II, pp. 850-853, and Plaintiff's Exhibit A-34, Map of East Denver Municipal Irrigation District Showing System as Constructed by Fred L. Lucas, Record Group A-84, Colorado State Archives, Denver, CO., and Mosley, "Denver Water," pp. 60-61.

24. Rocky Mountain News 24 January 1922, p. 4.
25. Ibid., 20 January 1922, p. 12.
26. Friedman, "Historic Properties," p. 108.
27. Rocky Mountain News, 21 January 1922, p. 16.
28. Friedman, "Historic Properties," p. 108.
29. Joseph E. King, Colorado Engineering Context, (Denver: Colorado Historical Society, 1984), pp. I-1-3.
30. Don C. and Edmund Smith, A Smith Atlas, Adams County, Colorado, (Flagler, CO: The Smith Map Co., Sept. 1, 1937), Colorado Historical Society, Denver, CO.
31. The resource descriptions used here come from the field inventory completed by Dames & Moore (D&M) in 1989.

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Denver, CO. Colorado Historical Society. Michael Creed Hinderlider Collection.

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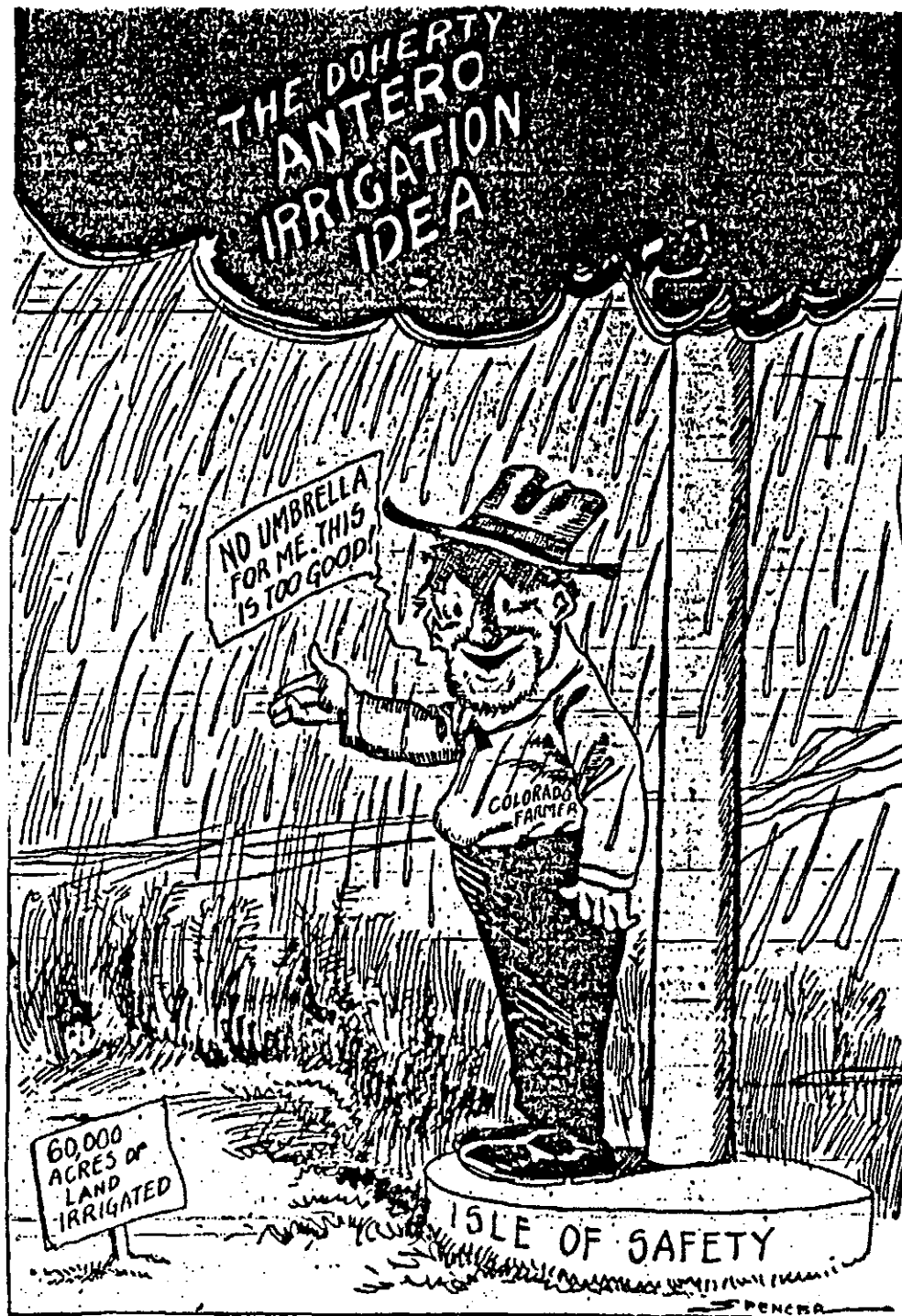
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Copied from: **MORE STORMS OF THIS KIND WOULD BE WELCOME.**

Denver Republican, 21 June 1913. This editorial cartoon appeared on the front page of the newspaper and aptly summarizes the booster spirit attached to the Canal by the Denver press.